U.S.N.										

B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

April 2024 Semester End Main Examinations

Programme: B.E. **Semester: III**
Branch: Biotechnology **Duration: 3 hrs.**
Course Code: 19BT3DCUO1 **Max Marks: 100**
Course: UNIT OPERATIONS-1

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

Important Note: Completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages. Revealing of identification, appeal to evaluator will be treated as malpractice.

		UNIT - I	CO	PO	Marks
1	a)	List the factors to be considered while selecting the repeating variables in Buckingham's Π-method of dimensional analysis.	CO 1	-	4
	b)	Derive barometric equation for pressure for isothermal condition using the principles of hydrostatic equilibrium for compressible and incompressible fluids.	CO 2	PO 1	10
	c)	Draw and analyze the boundary layer separation in fluid flow across solids with a neat sketch.	CO 3	PO 2	06
		UNIT - II			
2	a)	Water is flowing through a pipe of diameters 300mm & 200mm at the bottom and upper end respectively. The intensity of pressure at bottom end is 24.525N/cm^2 and the pressure at the upper end is 9.81N/cm^2. Compute the difference in elevation head if the rate of flow through the pipe is 40 L/sec.	CO 3	PO 2	10
	b)	Derive Bernoulli's equation without friction using Newton's second law of motion.	CO 2	PO 1	10
		UNIT - III			
3	a)	Explain the constructional details and working of a rotameter with a suitable diagram.	CO 2	PO1	08
	b)	Derive the flow equation for a venturimeter.	CO 2	PO 1	12
		OR			
4	a)	Draw and analyze the characteristic curves of a centrifugal pump. Elaborate on cavitation and NPSH.	CO 2	PO 1	12
	b)	Distinguish between i) Variable head and variable area meter ii) Orifice and Venturimeter	CO 2	PO 1	08
		UNIT - IV			
5	a)	Describe the laws governing size reduction.	CO 2	PO 1	10
	b)	Explain the construction and working of a cyclone separator.	CO 2	PO 1	10

			UNIT - V			
	6	a)	Distinguish between the various types of sedimentation.	***CO 2***	***PO 1***	**06**
		b)	Describe the working of a leaf filter with a neat sketch.	***CO 2***	***PO 1***	**08**
		c)	Discuss the types of fluidization.	***CO 2***	***PO 1***	**06**
			OR			
	7	a)	Derive equation for constant pressure filtration.	***CO 2***	***PO 1***	**10**
		b)	Explain the construction and working principle of double arm kneader with a neat labeled diagram.	***CO 2***	***PO 1***	**10**

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